

Seroepidemiology of HTLV-1 and HTLV-2 Infection in Neyshabur City, North-Eastern Iran, during 2010-2014

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Received 25 October 2015; revised 20 January 2016; accepted 24 January 2016

ABSTRACT

Background: Retroviruses of human T-lymphotropic viruses (HTLV-1 and HTLV-2) have been demonstrated to be endemic in the north-eastern region of Iran. This study was aimed to determine the HTLV-1 and HTLV-2 prevalence among healthy individuals in Neyshabur City during 2010-2014. **Methods:** A total of 8054 blood samples were collected from healthy participants in Neyshabur, North-Eastern Iran. The blood samples were screened for the presence of specific antibodies against HTLV-1 and HTLV-2 by using ELISA according to the manufacturer's instructions. **Results:** The overall seropositivity rate for HTLV-1 and HTLV-2 was found to be 6.55% (528 out of 8054) among participants. **Conclusion:** Both HTLV-1 and HTLV-2 were demonstrated to be at a high rate in healthy individuals. However, a smaller number of asymptomatic carriers were found in this study, as compared to those identified in previous investigations in the city. **DOI: 10.6091/21.1.57**

Keywords: Human T-lymphotropic virus, Seroepidemiology, Enzyme-linked immunosorbent assay, Iran

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INTRODUCTION

Human T-lymphotropic viruses (HTLV-1 and HTLV-2), classified in the retroviridae family, are among the first identified species^[1-3]. HTLV-1 and HTLV-2 are widespread all over the world and are endemic in different areas, including North-Eastern Iran^[4-6]. According to a previous study, the rate of HTLV-1 infection has been reported to be less than 0.26% in Mashhad, North-Eastern Iran, while it does not exceed 0.34% in other areas of the country^[7]. The prevalence of HTLV-1 infection in other countries such as Turkmenistan, Brazil, Spain, Korea and Japan was found to be 0.007%^[8], 1.9%^[9], 0.001%^[10], 0.27%^[11], and 0.12%^[12], respectively.

HTLV-1- and HTLV-2-infected carriers remain asymptomatic for a long time, serving as a potential source for the transmission of the disease^[13]. The aim of this investigation was to determine the prevalence of HTLV-1 and HTLV-2 among healthy individuals in Neyshabur, North-Eastern Iran, during 2010-2014.

MATERIALS AND METHODS

Study population

A total of 8054 healthy individuals from Neyshabur, North-Eastern Iran, were included in this study. Serum samples (5 ml) were prepared from the individuals and stored at -20°C until the ELISA test.

Table 1. Age- and sex-based distribution of individuals and overall HTLV-positive cases

Variable	No.	Positive cases (%)	Odds Ratio (OR)	OR (95%CI)	P value
Age (year)					
0-19	429	13(3.03)	Baseline		<0.0001
20-29	2556	49(1.92)	0.625	0.336-1.163	
30-39	2018	88(4.36)	1.459	0.807-2.637	
≥40	3051	377(12.36)	4.512	2.571-7.918	
Gender					
Male	1565	130(8.31)	1.386	1.128-1.704	0.002
Female	6489	398(6.13)			

Serological assays and confirmation tests

Serum samples were screened for the presence of specific antibodies against HTLV-1 and HTLV-2 by ELISA (Dia.Pro Diagnostic Bioprobes, Italy) according to the manufacturer's instructions^[14].

Statistical analysis

The SPSS software (version 20) was employed to analyze all data using chi-square and *t*-test. A $P < 0.05$ was considered to be statistically significant.

RESULTS AND DISCUSSION

Of 8054 healthy individuals participated in the study, 1565 (19.4%) and 6489 (80.6%) were males and females, respectively. As shown in Table 1, the mean age of males and females was 46 ± 3 and 51 ± 3 years, respectively. The positivity of the samples was 6.55% (528 out of 8054), including 3.6% for HTLV-1 and 1.4% for HTLV-2. Table 2 indicates the total prevalence of HTLV-1 and HTLV-2 in each year.

Previous studies have revealed that HTLV-1 is endemic in North-Eastern Iran^[15]. Another study in Neyshabur has indicated that the prevalence of HTLV-

1 is 7.2% (35 out of 483)^[16]. However, the rate of HTLV-1 seropositivity has gradually decreased from 1.97% in 1996 to 0.26% in 2014^[17-19] in other regions of North-Eastern Iran. Similarly, the results of the present study demonstrated that the prevalence of HTLV-1 has decreased in Neyshabur from 2010 to 2014. In a survey carried out in Mashhad in 2012, the rate of HTLV-1 was detected to be 0.47%^[20]. The seroprevalence of HTLV-1 did not exceed 0.19% in a study conducted by Safabakhsh *et al.*^[7]. It seems that the reduction in HTLV-1 rate is mainly due to the improvement of blood donor selection and increased awareness among blood donors. However, in a study performed by Rafatpanah *et al.*^[21] in Mashhad, it was revealed that the prevalence of HTLV-1 is 20% (10 positive samples), although no evidence of HTLV-2 infection was found among immuneblotted samples and nested PCR.

In the current study, over 3% of healthy individuals were positive for HTLV-1 in all five years. To the best of our knowledge, there is a small number of published data regarding HTLV-2 prevalence in Iran. Also, a lower rate of positive HTLV-1 infection was identified in the present investigation, when compared to a previously study in Neyshabur^[22]. This finding

Table 2. The annual prevalence of HTLV-1 and HTLV-2 investigated in this study

Year	Number	HTLV-1 (%)	HTLV-2 (%)	Total percentage
2014	Positive: 58 Total: 1350	3.01	ND	3.01
2013	Positive: 94 Total: 2337	4.11	ND	4.11
2012	Positive: 115 Total: 2188	5.12	ND	5.12
2011	Positive: 117 Total: 2057	5.13	ND	5.12
2010	Positive: 122 Total: 1789	5.74	ND	5.74

ND, not determined

highlights that Neyshabur is a major endemic region for HTLV-1. In addition, a higher prevalence of HTLV-1 was found in the age groups over 40 years, suggesting that there is a relationship between HTLVs and the age of individuals.

In the present study, a high rate of HTLV-1 among serum samples was detected using the ELISA test among healthy individuals in Neyshabur city during 2010-2014. The results from this study emphasize that HTLV is still an important endemic disease in Neyshabur. More importantly, the prevalence of HTLV-1 in Neyshabur was detected to be higher than other city (Mashhad) in all duration of this study, though being in a decreasing status compared to the previous reports.

ACKNOWLEDGEMENTS

The authors would like to thank the staffs of the Mashhad Academic Center for Education, Culture and Research (ACECR) laboratory in Neyshabour for their kind cooperation. This study was financially supported by Research and Technology Deputy of ACECR, Mashhad Branch (Iran).

CONFLICT OF INTEREST. None declared.

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